

Regenerative DC Loads



6RL Series
3.1kW to 450kW
Energy Recycling
Up to 1500Vdc, 510A
3U Rack Height @ 15kW



KEY BENEFITS OF 6RL REGENERATIVE DC LOADS

- Available models for 208 V or 480 V AC Grid connection
- Energy recovery of the supplied DC energy into the local grid reduces utility bills and air conditioning costs
- Galvanically isolated DC input
- Input power ratings: up to 9.3 kW per unit for 208V grid models and up to 15 kW per unit for 480V grid models
- Parallel operation up to 450 kW
- Input voltages: up to 1500 V
- Input currents: up to 510 A per unit
- FPGA based digital control
- Large color TFT touch panel display
- User profiles, true function generator
- Galvanically isolated analog and USB interface
- Extra USB port on the front for USB memory stick
- Optional, digital, plug & play interfaces or alternatively installed GPIB port
- SCPI command set and ModBus support

Regenerative DC Loads like the 6RL Series are excellent for the environment as they produce little or no heat. They also save money by sending the energy sent into the load back on the AC power grid. For many test requirements like full load burn-in, this can save a significant amount in terms of reduced utility bills, often resulting in quick financial payback of the capital invested in the electronic loads. It also reduces HVAC cost as no cooling of the test room is required.

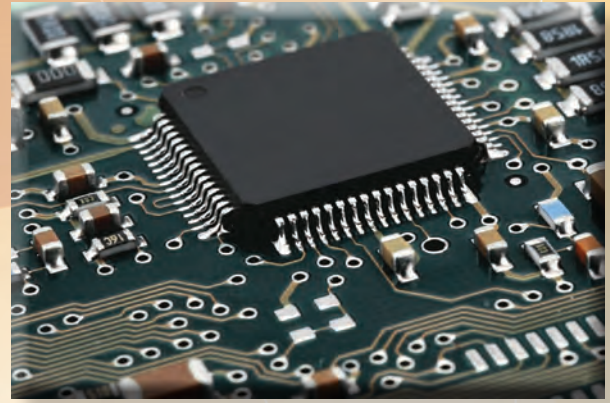
With a wide range of available power levels and input voltage ranges, the 6RL Series of regenerative DC Loads are an excellent choice for many DC test applications. Single chassis power up to 15kW and 1500V input.

Master/ Slave mode for series or parallel operation available for higher voltage and or power requirements.

VALUE & PERFORMANCE BY LEVERAGING MODERN TECHNOLOGY

The 6RL Series of regenerative DC Electronic Loads uses state of the art field programmable logic array (FPGA) technology to implement a digital power conversion topology that combines high efficiency with a rich feature set and excellent specifications. This results in 16-bit resolution precision for both set points and measurements throughout.

Packaged in a compact, standard 19" rack mount chassis, these powerful functions are easily accessible through an easy to use, color touch screen based user interface from the front panel or by sending commands over one of several available digital control interfaces.



BROAD RANGE OF APPLICATIONS

The energy efficient operation of the 6RL loads makes them suitable for a broad range of DC power applications where loading of power supplies or discharging of bat-

teries involves high amounts of energy. This is typically the case in Power Supply test and Electric Vehicles power conversion and battery test applications.



Power Supply Test & Burn-in

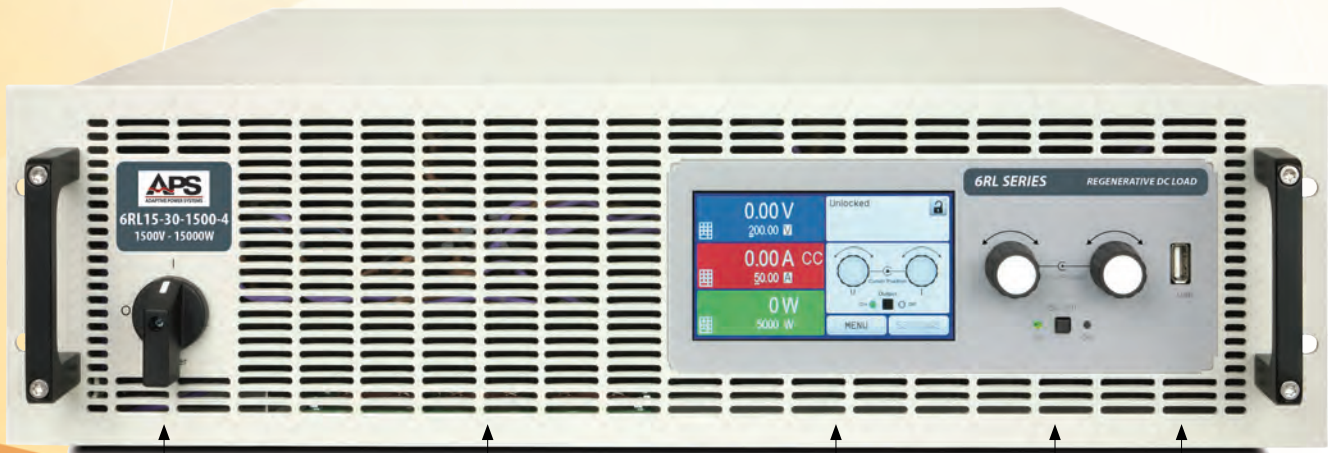


Electric Vehicle Component Test



Research & Development

MODERN COLOR TOUCH USER INTERFACE FOR EASE OF OPERATION



Power On/Off

Air Intake



Color LCD Touch Display

Dual Shuttles Load On/Off

USB Port

All 6RL Series models share an intuitive user interface using a combination of a large color LCD touch screen and two rotary shuttle knobs. This results in an easy to use electronic load for novice and experienced users alike. The large color LCD allows visualization of output set-

tings and configurations as well as a wide assortment of precision DC measurements.

Changing parameters such as voltage or current can be done using the touch screen or the shuttle.

VALUE PROPOSITION

General

The 6LR Series of electronic DC loads offer all the features and function of a conventional DC load but rather than dissipating the absorbed energy as heat, it recovers 95% of this energy back to the mains instead.

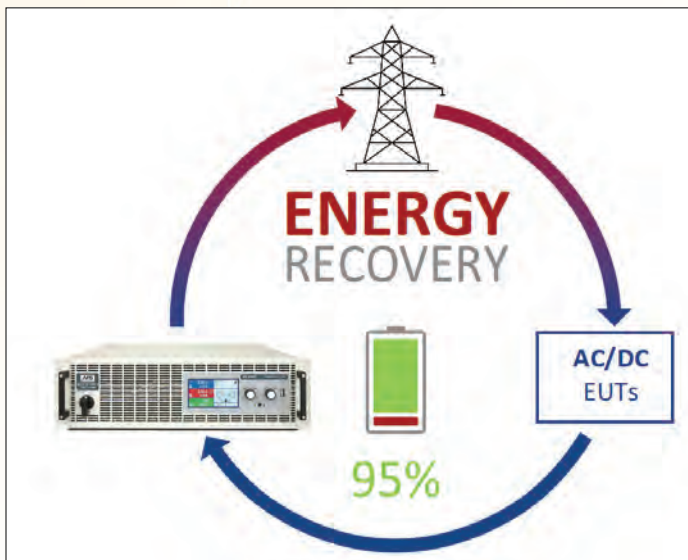
The energy recovery function converts the supplied DC energy into a synchronous sine current and feeds it back into the local grid, eliminating the usual heat dissipation to a minimum and saving energy costs at the same time. The large color TFT touch panel offers a different and intuitive kind of manual operation, compared to most electronic loads on the market today.

Power ratings, voltages, currents

The available input voltage ranges from models with 0~80 V DC input up to 0~1500 V DC. Input currents up to 510 A are available on two models. The series offers several power classes of 3.1kW, 5kW, 6.2kW, 9.3KW, 10 kW or 15 kW in only 3U rack space. Higher power requirements can be met using paralling multiple loads up to 480 kW in cabinets for a significantly high total current.

Grid Connection

All models require a 3-phase Delta mains supply connection (no Neutral conductor). The loads are available for either a 208 Vac Grid or a 380~480 Vac connections.

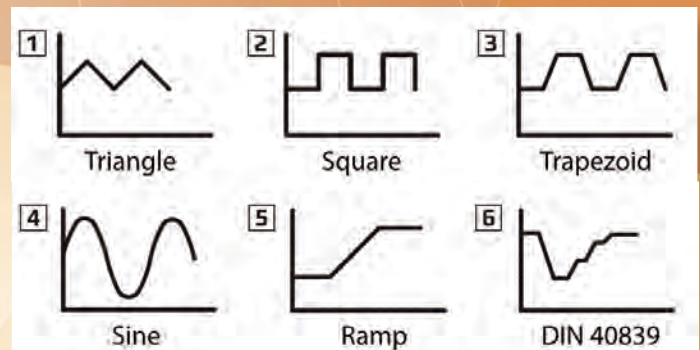


Energy recovery

A key feature of these electronic loads is the use of the AC input grid connection for recovery of the received DC energy from the unit under test. It is converted with an efficiency of up to 95%. Recycling energy recovery helps to lower energy costs and avoids expensive cooling systems as required for conventional electronic or resistive loads which convert the DC input energy into heat.

Function generator

A built-in digital function and arbitrary waveform generator allows for the control and execution of user-programmable load profiles and can generate sine, square, saw tooth and ramp functions in an arbitrary order.



With a programmable value table of 3276 points, the load can simulate non-linear internal resistances, such as those of batteries or LED strings.

Battery test

Battery test modes for various battery types, such as constant current or constant resistance discharging are supported. This mode displays values for elapsed testing time and consumed capacity (Ah). Adjustable under voltage threshold and maximum test period settings are supported to prevent over-discharge.

Master-slave Configurations

All models feature a digital master-slave bus. It can be used to connect up to 32 identical models in parallel operation to a bigger system. The configuration of the master-slave system is done from the control panels of the units or by remote control. System control is accomplished by manual or remote control. As an alternative to the standard models, there are specific slave models available.

Share Bus

The Share Bus is an analog connection used to balance current across multiple similar loads in a parallel connection. It can also be used to create a two-quadrant system with DCS Series power supplies. Such a system supports source-sink capability for battery cycling.

Power Grid Monitoring

6RL loads feature a switch-off function in case of an interruption of the grid connection. The load constantly monitors its AC input voltage and frequency and will automatically switch off the power stages in case upper or lower limits are exceeded.

TECHNICAL SPECIFICATIONS 208V Grid Connection Models

MODEL	Power	Voltage	Current	Resistance	Efficiency	Weight
6RL3-170-80-2	0 ~ 3.1 kW	0 ~ 80 Vdc	0 ~ 170 Adc	0.01 ~ 12 Ω	92.5%	17 kg / 37.5 lbs
6RL3-70-250-2	0 ~ 3.1 kW	0 ~ 250 Vdc	0 ~ 70 Adc	0.09 ~ 120 Ω	93.5%	17 kg / 37.5 lbs
6RL3-30-500-2	0 ~ 3.1 kW	0 ~ 500 Vdc	0 ~ 30 Adc	0.42 ~ 480 Ω	94.5%	17 kg / 37.5 lbs
6RL3-22-750-2	0 ~ 3.1 kW	0 ~ 750 Vdc	0 ~ 22 Adc	0.8 ~ 1100 Ω	94.5%	17 kg / 37.5 lbs
6RL6-340-80-2	0 ~ 6.2 kW	0 ~ 80 Vdc	0 ~ 340 Adc	0.005 ~ 6 Ω	92.5%	24 kg / 52.9 lbs
6RL6-140-250-2	0 ~ 6.2 kW	0 ~ 250 Vdc	0 ~ 140 Adc	0.04 ~ 60 Ω	93.5%	24 kg / 52.9 lbs
6RL6-60-500-2	0 ~ 6.2 kW	0 ~ 500 Vdc	0 ~ 60 Adc	0.21 ~ 240 Ω	94.5%	24 kg / 52.9 lbs
6RL6-44-750-2	0 ~ 6.2 kW	0 ~ 750 Vdc	0 ~ 44 Adc	0.43 ~ 550 Ω	94.5%	24 kg / 52.9 lbs
6RL6-30-1000-2	0 ~ 6.2 kW	0 ~ 1000 Vdc	0 ~ 30 Adc	0.83 ~ 950 Ω	94.5%	24 kg / 52.9 lbs
6RL9-510-80-2	0 ~ 9.3 kW	0 ~ 80 Vdc	0 ~ 510 Adc	0.003 ~ 4 Ω	92.5%	31 kg / 68.3 lbs
6RL9-210-250-2	0 ~ 9.3 kW	0 ~ 250 Vdc	0 ~ 210 Adc	0.03 ~ 40 Ω	93.5%	31 kg / 68.3 lbs
6RL9-90-500-2	0 ~ 9.3 kW	0 ~ 500 Vdc	0 ~ 90 Adc	0.14 ~ 160 Ω	94.5%	31 kg / 68.3 lbs
6RL9-66-750-2	0 ~ 9.3 kW	0 ~ 750 Vdc	0 ~ 66 Adc	0.29 ~ 360 Ω	94.5%	31 kg / 68.3 lbs
6RL9-30-1500-2	0 ~ 9.3 kW	0 ~ 1500 Vdc	0 ~ 30 Adc	1.2 ~ 1450 Ω	94.5%	31 kg / 68.3 lbs



3100 W Models, 750V Max.



6200 W Models, 1000V Max.



9300 W Models, 1500V Max.

TECHNICAL SPECIFICATIONS 380V ~ 480V Grid Connection Models

MODEL	Power	Voltage	Current	Resistance	Efficiency	Weight
6RL5-170-80-4	0 ~ 5 kW	0 ~ 80 Vdc	170 Adc	0.02 ~ 25 Ω	92.5%	18 kg / 39.7 lbs
6RL5-70-200-4	0 ~ 5 kW	0 ~ 200 Vdc	70 Adc	0.1 ~ 150 Ω	93.5%	18 kg / 39.7 lbs
6RL5-40-360-4	0 ~ 5 kW	0 ~ 360 Vdc	40 Adc	0.3 ~ 520 Ω	93.5%	18 kg / 39.7 lbs
6RL5-30-500-4	0 ~ 5 kW	0 ~ 500 Vdc	30 Adc	0.5 ~ 1000 Ω	94.5%	18 kg / 39.7 lbs
6RL5-20-750-4	0 ~ 5 kW	0 ~ 750 Vdc	20 Adc	1.2 ~ 2200 Ω	94.5%	18 kg / 39.7 lbs
6RL10-340-80-4	0 ~ 10 kW	0 ~ 80 Vdc	340 Adc	0.01 ~ 13 Ω	92.5%	25 kg / 55.1 lbs
6RL10-140-200-4	0 ~ 10 kW	0 ~ 200 Vdc	140 Adc	0.05 ~ 75 Ω	93.5%	25 kg / 55.1 lbs
6RL10-80-360-4	0 ~ 10 kW	0 ~ 360 Vdc	80 Adc	0.15 ~ 260 Ω	93.5%	25 kg / 55.1 lbs
6RL10-60-500-4	0 ~ 10 kW	0 ~ 500 Vdc	60 Adc	0.25 ~ 500 Ω	94.5%	25 kg / 55.1 lbs
6RL10-40-750-4	0 ~ 10 kW	0 ~ 750 Vdc	40 Adc	0.6 ~ 1100 Ω	94.5%	25 kg / 55.1 lbs
6RL15-510-80-4	0 ~ 15 kW	0 ~ 80 Vdc	510 Adc	0.006 ~ 10 Ω	92.5%	32 kg / 70.5 lbs
6RL15-210-200-4	0 ~ 15 kW	0 ~ 200 Vdc	210 Adc	0.033 ~ 50 Ω	93.5%	32 kg / 70.5 lbs
6RL15-120-360-4	0 ~ 15 kW	0 ~ 360 Vdc	120 Adc	0.1 ~ 180 Ω	93.5%	32 kg / 70.5 lbs
6RL15-90-500-4	0 ~ 15 kW	0 ~ 500 Vdc	90 Adc	0.16 ~ 340 Ω	94.5%	32 kg / 70.5 lbs
6RL15-60-750-4	0 ~ 15 kW	0 ~ 750 Vdc	60 Adc	0.4 ~ 740 Ω	94.5%	32 kg / 70.5 lbs
6RL15-40-1000-4	0 ~ 15 kW	0 ~ 1000 Vdc	40 Adc	0.8 ~ 1300 Ω	94.5%	32 kg / 70.5 lbs
6RL15-30-1500-4	0 ~ 15 kW	0 ~ 1500 Vdc	30 Adc	2.5 ~ 3000 Ω	94.5%	32 kg / 70.5 lbs



5000 W Models, 750V Max.



10000 W Models, 750V Max.



15000 W Models 1500V Max.

TECHNICAL SPECIFICATIONS

MODEL	All Models
AC Input	
Input Voltage	US 208 V models: 208V _{LL} ±10% 2ph/3ph
	US 480V models: 380V _{LL} ~ 480V _{LL} 3ph
Frequency	45~66 Hz
DC Voltage Mode	
Accuracy	< 0.3% of F.S.
DC Current Mode	
Accuracy	< 0.4% of F.S.
Load regulation 0-100% ΔVdc	< 0.15% of F.S.
Slew Rate 10~90%	< 300 μsec
DC Power Mode	
Accuracy	< 1.5% of F.S.
Resistance Mode	
Accuracy	≤ 1% of max. resistance + 0.3% of rated current
Protection	OT, OVP, OCP, OPP, PF
Parallel Operation	Master-slave, up to 32 units
Regulatory Standards	EN 60950:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013 EN 61000-6-3:2011-09, EN 61000-6-4:2011-09 Radiation Class B EN 50160:2011-02 Grid Class 2
Dimensions (W x H x D)	
208Vac Input Models	19" x 5.25" x 24" 483 x 133 x 609 mm
480Vac Input Models	19" x 5.25" x 26.4" 483 x 133 x 670 mm

MODEL	All Models	
Environmental		
Pollution Degree	2	
Protection Class	1	
Cooling	Forced air, temperature controlled fans	
Temperature	Operating	0~50 °C / 32~122 °F
	Storage	-20~70 °C / -4~158 °F
Relative humidity	<80%, non-condensing	
Altitude	Operating	<2000 m (1.242 mi)
Front Panel		
Display	Color Touch Screen Graphics LCD	
Controls	Dual Rotary Digital Encoders	
Output on/off	Push Button	
Digital Interfaces		
Internal	1x USB type B for communication, 1x GPIB (optional)	
Interface Slot	1x for retrofittable plug-in modules	
Analog Interfaces		
Internal	Built-in, 15 pole D-Sub (female), galvanically isolated	
Signal range	0~5 V or 0~10 V (selectable)	
Inputs	V, I, P, R, remote control on-off, DC input on-off, resistance mode on-off	
Outputs	V, I, overvoltage, alarms, reference voltage	
Accuracy V / I / P / R	0~10 V: < 0.2% 0~5 V: < 0.4%	

Options

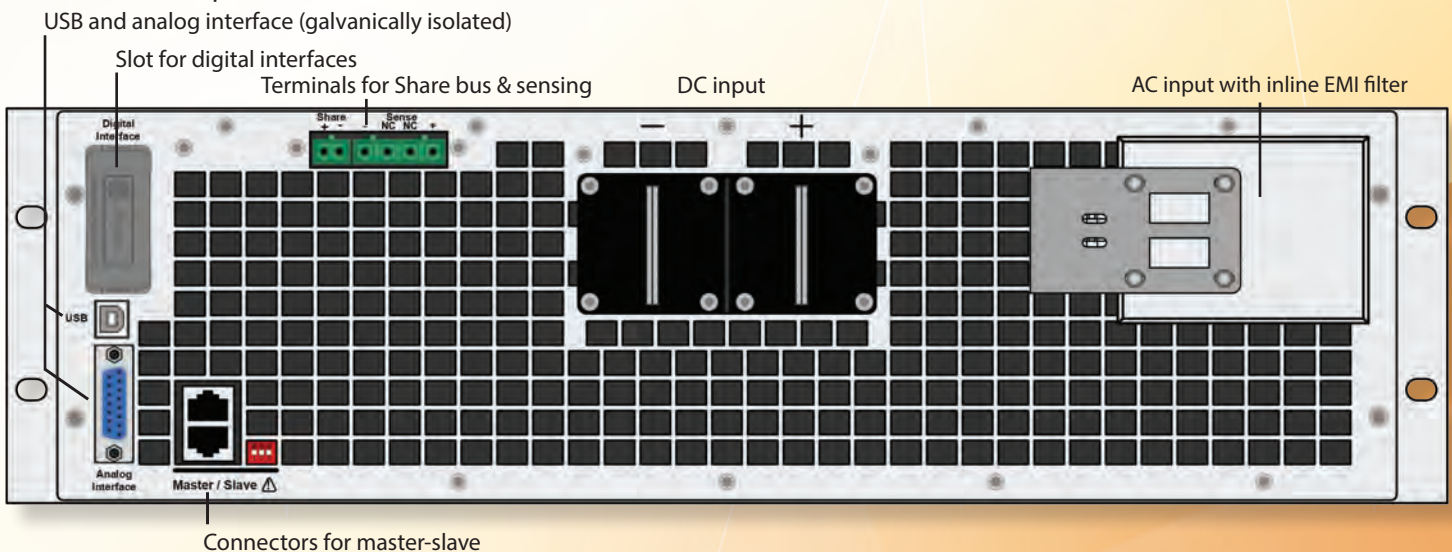
Interchangeable Digital interface modules are available as options for:

- RS232, CAN, CANopen, ModBus TCP, Profibus, Profinet/IO, EtherCAT or Ethernet. One slot is available for any module.
- Three-way interface (3W) with a GPIB port installed instead of the default slot for retrofittable interface modules



REAR PANEL CONNECTIONS

All grid power input and DC Load input connectors as well as interfaces are located on the rear panel of the load. This supports rack mounting of the unit in ATE systems as all internal cabinet wiring routes to the back of the unit and leaves the front panel display and controls accessible from the front. The illustration below shows the various connector locations on the rear panel.



ORDERING INFORMATION

208Vac 3 PHASE GRID CONNECTION MODELS

3.1KW MODELS	DESCRIPTION
6RL3-170-80-2	DC Regenerative Load, 3100W, 0-80V, 0-170A
6RL3-70-250-2	DC Regenerative Load, 3100W, 0-250V, 0-70A
6RL3-30-500-2	DC Regenerative Load, 3100W, 0-500V, 0-30A
6RL3-22-750-2	DC Regenerative Load, 3100W, 0-750V, 0-22A
6.2KW MODELS	DESCRIPTION
6RL6-340-80-2	DC Regenerative Load, 6200W, 0-80V, 0-340A
6RL6-140-250-2	DC Regenerative Load, 6200W, 0-250V, 0-140A
6RL6-60-500-2	DC Regenerative Load, 6200W, 0-500V, 0-60A
6RL6-44-750-2	DC Regenerative Load, 6200W, 0-750V, 0-44A
6RL6-30-1000-2	DC Regenerative Load, 6200W, 0-1000V, 0-30A
9.3KW MODELS	DESCRIPTION
6RL9-510-80-2	DC Regenerative Load, 9300W, 0-80V, 0-510A
6RL9-210-250-2	DC Regenerative Load, 9300W, 0-250V, 0-210A
6RL9-90-500-2	DC Regenerative Load, 9300W, 0-500V, 0-90A
6RL9-66-750-2	DC Regenerative Load, 9300W, 0-750V, 0-66A
6RL9-30-1500-2	DC Regenerative Load, 9300W, 0-1500V, 0-30A

380~480Vac 3 PHASE GRID CONNECTION MODELS

5KW MODELS	DESCRIPTION
6RL5-170-80-4	DC Regenerative Load, 5000W, 0-80V, 0-170A
6RL5-70-200-4	DC Regenerative Load, 5000W, 0-200V, 0-70A
6RL5-40-360-4	DC Regenerative Load, 5000W, 0-360V, 0-40A
6RL5-30-500-4	DC Regenerative Load, 5000W, 0-500V, 0-30A
6RL5-20-750-4	DC Regenerative Load, 5000W, 0-750V, 0-20A
10KW MODELS	DESCRIPTION
6RL10-340-80-4	DC Regenerative Load, 10000W, 0-80V, 0-340A
6RL10-140-200-4	DC Regenerative Load, 10000W, 0-200V, 0-140A
6RL10-80-360-4	DC Regenerative Load, 10000W, 0-360V, 0-80A
6RL10-60-500-4	DC Regenerative Load, 10000W, 0-500V, 0-60A
6RL10-40-750-4	DC Regenerative Load, 10000W, 0-750V, 0-40A
15KW MODELS	DESCRIPTION
6RL15-510-80-4	DC Regenerative Load, 15000W, 0-80V, 0-510A
6RL15-210-200-4	DC Regenerative Load, 15000W, 0-200V, 0-210A
6RL15-120-360-4	DC Regenerative Load, 15000W, 0-360V, 0-120A
6RL15-90-500-4	DC Regenerative Load, 15000W, 0-500V, 0-90A
6RL15-60-750-4	DC Regenerative Load, 15000W, 0-750V, 0-60A
6RL15-40-1000-4	DC Regenerative Load, 15000W, 0-1000V, 0-40A
6RL15-30-1500-4	DC Regenerative Load, 15000W, 0-1500V, 0-30A

OPTIONS

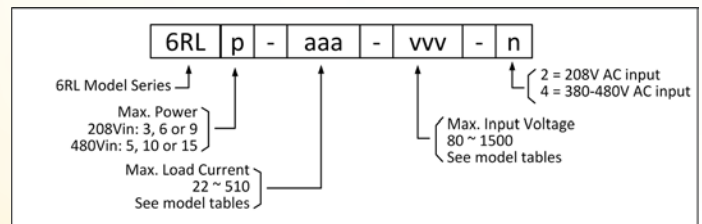
OPTIONS	DESCRIPTION	OPTIONS	DESCRIPTION
OPT-232	RS232 Serial Interface	OPT-ETH2P	Ethernet/IP 2 Port Interface
OPT-PBUS	Profibus DPV1- Interface	OPT-PNET1P	Profinet-IO 1 Port Interface
OPT-CANO	CANopen Interface	OPT-PNET2P	Profinet-IO 2 Port Interface
OPT-DNET	DeviceNet Interface	OPT-CAN	CAN Interface
OPT-MBUS1P	Modbus-TCP 1 Port Interface	OPT-ECT	EtherCAT Interface
OPT-MBUS2P	Modbus-TCP 2 Port Interface	OPT-3IF	3 Way Interface Analog/USB/GPIB
OPT-ETH1P	Ethernet/IP 1 Port Interface	Opt-RCT	Redundant Contactors

Service and Support

Adaptive Power Systems' customer support is second to none. Our Customer Support Program provides the training, repair, calibration, and technical support services that our customers value. So, in addition to receiving the right test equipment, our customers can also count on excellent support before, during and after the sale. With company owned support and service centers around the world, support is never far away.

Model Number Encoder

Use the encoder shown below to configure the correct regenerative DC load model.



NORTH & SOUTH AMERICA

PPST Solutions, Inc.
Irvine, USA
Phone: +1(888) 239-1619
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TM

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